



DINOSAUR DREAMING 2008 FIELD REPORT

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## About the cover:

View of the Flat Rocks site, Inverloch, looking towards the Bridge East Sub-Site. Work is just about to commence for the day. Site manager, John Wilkins is setting up the pumps in readiness to pump out the water in the excavation area.

## Dinosaur Dreaming 2008 field report

Lesley Kool

Planning for Dinosaur Dreaming 2008 began almost as soon as the 2007 field season ended. A casual remark by Alanna Maguire, one of the core crew, suggesting a major fund raiser led to the very successful "Dig Deep for Dinosaurs" auction held in November 2007. Alanna's report on all the hard work that went in to make the auction a success is included in this annual report.

Over the last few years the Dinosaur Dreaming project has expanded to not only concentrate on the principal site at Inverloch but to include the ongoing prospecting in both the Strzelecki and Otway Ranges, to the east and west of Melbourne respectively. Principle prospector, Mike Cleeland, has explored most of the Early Cretaceous outcrops along the south coast of Victoria and in the process has discovered new fossil localities. One of those localities revealed a partial ornithomimid dinosaur skeleton, featured on the cover of the 2006 annual report. This locality is situated in the Otway Ranges, close to Cape Otway, and was the chosen site to introduce the new Dinosaur Dreaming volunteers to the art of excavating. David Pickering, Melbourne Museum's Vertebrate Palaeontology Collections Manager, organised a ten day field trip to the site now known as "Eric the Red West" last December. Experienced crew members mentored the new volunteers and a number of very interesting fossil bones were uncovered.

In previous annual reports we have included a map that showed the Early Cretaceous fossil localities of both the Otway and Strzelecki Ranges, but so many new localities and specimens have been discovered recently that it became difficult to fit them all into one map. So this year we have produced two maps; the Otway and Strzelecki Ranges localities separately, which we hope will make it easier to see just how many localities there are and the diversity of fauna present at each.

The Flat Rocks site is one of a number of fossil localities discovered along the Bass Coast, which stretches from San Remo to Inverloch. It is the principal site of the Dinosaur Dreaming project, situated close to the town of Inverloch, on the southern coast of Victoria, approximately 150 kilometres south-east of Melbourne. It was discovered in 1991 as part of a prospecting program conducted jointly by Monash University and Melbourne Museum. Annual excavations began in 1994 and this year was our 15th field season at the site. The fossil layer at this site is so extensive that even after 15 years of excavations we still recover an average of more than 1000 bones per season.

Nick van Klaveren, our excavation manager for the last 14 years, was unable to join the dig this year because of work commitments. We were fortunate to be able to call upon the not inconsiderable skills of long-term dinosaur dreamer John Wilkins to step up and fill the gap. John is not a geologist but he has more than ten years experience working along side Nick "at the coal face" and brought some of his innovative ideas with him. He has written a very comprehensive report, which we hope you will enjoy.

At the end of the 2007 field season Dale Sanderson, former Monash University student and current field geologist working for Goldfields, St. Ives in Kambalda, W.A., carefully mapped the most westerly area of the Flat Rocks fossil layer. His comprehensive report was included in the 2007 annual report. It was decided to act on some of his conclusions and investigate the areas pinpointed by Dale as having potential. To access these layers we had to remove the last vestiges of "Prep Rock", a sandstone knoll that in the early years of excavations began as the collection point for fossil specimens. Prep Rock was much larger when we first started excavating the site, but about three years ago erosion got the better of it and it

disintegrated, leaving only a shadow of its former self. It took only an hour or so to dismantle the remains of the rock, which then gave us access to the potential treasure trove beneath it.

However, the fossils did not come pouring out as anticipated. In fact, the concentration of fossil bones was very low compared with the rest of the fossil layer at this site. But among the few specimens that did appear were a number of isolated small ornithomimid teeth, a small, recurved tooth, similar to that of a theropod dinosaur, lacking serrations along with a small astragalus (ankle bone). After a week of sampling the different sub-sites featured in Dale's report we decided to abandon the Prep Rock for the time being and concentrate on the Bridge East area at the eastern end of the fossil layer. Excavations at Bridge East in the 2007 field season had resulted in the recovery of a number of interesting specimens including two large ankylosaur osteoderms, a large theropod vertebral centrum, a mystery jaw, which still remains unidentified and finally Nicola Sanderson's mammal tooth (see Tom Rich's report for more enlightenment on this specimen). So we returned to this part of the fossil layer with high hopes and we were not disappointed.



Site manager, John Wilkins removing the last of "Prep Rock" in readiness for excavation.

Over 700 fossil bones and teeth were catalogued, but more than twice as many bone fragments, commonly referred to as "shoulder bones" were collected as well. Among the catalogued specimens were 3 mammal jaws, taking the total found since 1997 to 45. Quite an achievement considering most of the jaws are less than two centimetres in length!. Two of the jaws were found by Caroline Ennis and Mary Walters, both experienced mammal jaw finders. Caroline has now found a total of three mammal jaws and this is champion Mary's fourth mammal jaw, including the only mammal jaw from the Otway Group.

The third mammal jaw was found by Mike Cleeland who, over the years, has found such amazing fossils as the

*Koolasuchus cleelandi* lower jaws and a partial dinosaur skeleton. But until this year he had never discovered a mammal jaw. So we are delighted for Mike that he can finally add "mammal jaw finder" to his list of accomplishments. Mike's mammal jaw has turned out to be rather special too. It belonged to a monotreme called *Teinolophos trusleri* and although the three teeth are not well preserved the back of the jaw reveals details that are not preserved in other known specimens. Tom Rich discusses this specimen and his on-going research into the Victorian Early Cretaceous mammals in his enclosed report.

It has become a tradition to present new mammal jaw discoverers with a silver mammal jaw pin at the "end of dig" party. However, we decided to do something special for Mike. Anyone who knows Mike is aware of his passion for the thylacine. He is a member of a group which has carefully documented over 800 sightings of the elusive and commonly believed extinct Tasmanian tiger. So, on the evening of the party, David Pickering presented Mike with a cast of a thylacine jaw from the Museum. Even though the thylacine is a marsupial and not a monotreme, we think Mike was pretty pleased with his award.

This year's "end of dig" party was special for another reason. We were very fortunate to have Bill Hopkins, an "ex-Dinosaur Cover", join us for the last three weeks of the dig. Bill hails from Alaska and was a member of the Dinosaur Cove team in 1986 and 1991. He bribed his way onto the Dinosaur Dreaming team with promises of his own Alaskan smoked salmon. Who could turn that down? To make Bill's trip more memorable we contacted other ex-Dinosaur Covers who he would have known and invited them to the party. It was quite a reunion and it was great to see so many "old faces" including Helen Wilson, John Herman and Don Manning.

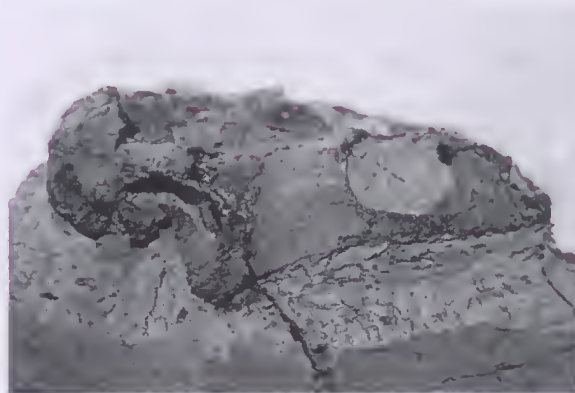


Dave Pickering presents Mike Cleeland with his award for finding his first mammal jaw. "Dinosaur Covers" Don Manning and John Hermann and their wives are looking on.

For me the highlight of the 2008 field season was the discovery of the first complete turtle skull from Flat Rocks. Apart from fish jaws and scales the remains of turtles are most common fossils found at the site. However, in the past we have found only pieces of turtle shell, isolated limbs and skull fragments, so it has been a source of frustration for a turtle lover like me. One of the specimens discovered this year was so badly damaged during extraction that it sat on the floor of my preparation room for over a month before I plucked up the courage to try and reconstruct it. At the time I had no idea what it represented, only that it looked interesting. Having glued as many of the rock fragments back together as I could, I then carefully started removing the rock. Even as I exposed the bone I still had no idea what it could be. Most of my preparation is carried out using a low powered microscope. I only see small areas of the

rock and bone at any one time. It was not until I had finished removing the last section of rock that I was able to look at the specimen in its entirety. To my amazement I realised I was looking at the top of a turtle skull.

We have found three turtle braincases (the inside of the skull where the brain sits!) from Flat Rocks, but for the first time I could see the outside of the skull and more importantly the back of the skull. The skull roof in most modern turtle skulls has been significantly reduced, resulting in a narrow crest that runs along the centre of the skull to the back. This new turtle skull has no reduction at the back, suggesting that it is very primitive.



The most complete turtle skull yet found at the Flat Rocks site. It will help to sort out relationships with the other turtle skull fragments found during previous field seasons.

There are only two turtles named from the Early Cretaceous of Victoria, both from the Otway Group. *Chelycarapookus arcuatus* was found near Casterton in western Victoria and is represented by a natural cast of the inside of a turtle shell. *Otwayemys cunicularius* is known from a number of elements, including an almost complete shell, lower jaws and skull fragments, found at Dinosaur Cove. None of these turtle specimens include a complete skull. Mike Cleeland discovered a partial turtle skull at Cape Paterson in the Strzelecki Group in 2006, which caused great excitement, as it looked like it could be ancestral to *Meiolania*, the extinct group of giant land tortoises found only in Australia and South America. It was sent to Gene Gaffney at the American Museum of Natural History in New York, along with the other turtle braincases from Flat Rocks. Gene thinks these specimens are more closely related to an Asian turtle *Mongolochelys*.

The new turtle skull is an important specimen, which will hopefully sort out relationships of all the turtle skull material, including Mike's turtle skull, as features on the new skull are also present on his specimen. The skull is currently being moulded and a cast will be sent to Gene for his insights.

One specimen engendered instant excitement during the dig. It was the largest ornithomimid dinosaur maxilla (upper jaw) yet found at the site. This was found by Gerry Kool and what was even more impressive was that the rock broke around the jaw instead of through it, which is what happens 99 times out of 100. It is quite a thrill to split a rock and see a fossil bone that has been trapped in that rock for more than 115 million years and know that you are the first person in the whole world to see it! When a bone is unbroken and you can see a couple of teeth gleaming at you in the sunshine, it's priceless.

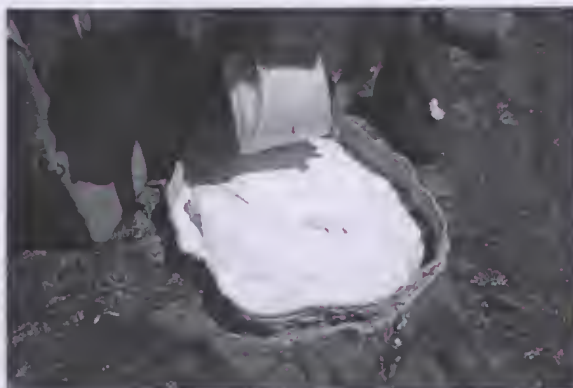
The jaw has four exposed teeth and five unerupted teeth preserved. Dinosaurs replaced their teeth continuously throughout their lives and had new teeth in the jaw below the erupted teeth, waiting to take their place. Gerry's find is the most complete maxilla recovered at the Flat Rocks site and is currently being prepared by David Pickering at the Melbourne Museum.



*Ornithomimid maxilla (upper jaw) found this field season, showing four erupted teeth and five unerupted teeth.*

One of the jobs we set ourselves during the 2008 field season was the moulding of the theropod dinosaur footprint, which was found by Tyler Lamb, one of the Dinosaur Dreaming 2007 crew members. The footprint lay only 15 metres from the Flat Rocks site, but went un-noticed until Tyler spotted it. It is approximately 30 cms in diameter and it was decided that to try and remove it would only cause it to break. So, the next best thing was to make a mould and ultimately cast it so there will be a record in the Melbourne Museum.

As the footprint is situated in the inter-tidal zone we had to wait for a relatively low tide on a fine day that gave us the optimum time to pour the silicon rubber cast. The result was a mould from which we can make as many casts of the footprint as we need with no damage to the real specimen.



*Pouring the silicon rubber over the theropod footprint, near the Flat Rocks site, to make a mould.*

During the field season, a paper was published on the results of research by trace fossil expert Tony Martin (Emory University, Atlanta, Georgia, USA) on the fossil crustaceans discovered in the Strzelecki and Otways groups. Tony had first visited the site during the 2006 field season and had discovered our first dinosaur footprint as well as fossil crustacean burrows. Subsequent research and prospecting turned up a crustacean body fossil from Dinosaur Cove and more fossil burrow localities along the coast. His paper "Fossil Evidence in Australia for Oldest known Freshwater Crayfish in Gondwana" was published in *Gondwana Research* 14, pp.287-296. It also featured in the *National Geographic News*, which included an image of the body fossil of a crayfish from Dinosaur Cove, in the Otways. ([news.nationalgeographic.com/news/2008/02/080208-crayfish.html](http://news.nationalgeographic.com/news/2008/02/080208-crayfish.html))

Tony's wife Ruth happens to be is an artist who has an interest in Tony's field of work. In 2007 she produced a wonderful reconstruction of a small ornithomimid dinosaur in a burrow, which resulted from a discovery by Tony and colleagues of dinosaur bones found in a burrow in Montana. She named the piece "Mother Dinosaur – Mother Earth"

and we were so impressed with it that we asked her if we could put it on the back of our 2008 dig T shirts. She generously allowed us to use it and everyone who has seen it agrees that it looks fantastic. Thank you again Ruth.



*Crew member David Shean modelling the Dinosaur Dreaming 2008 T shirt, featuring Ruth Schowalter's wonderful design.*

We were delighted to receive a visit from David and Judy Elliott during the dig. David and Judy own a property in central Queensland on which some amazing dinosaur bones have been found, including the famous "Elliot", a large sauropod dinosaur from the Early Cretaceous. David and Judy were in Victoria visiting the Melbourne Museum's dinosaur collection as background for a story on Dinosaur Cove, which features in their latest edition of "Age of Dinosaurs". They never got the chance to visit Dinosaur Cove when it was operating so they decided they would come to the next best thing. Our dig site, on the coast at the mercy of the tides, is so different from theirs and the size of the bones we find are so much smaller that it was quite an eye opener for them to see how we work and what we find.

The Elliotts joined us at the dig party and Judy presented us with a set of "Age of Dinosaurs" publications for our library.



*David Elliott (in grey and black top) and Judy Elliott (behind in blue shirt) at the dig party.*

The scientific publication "New Scientist", in conjunction with Museum Victoria, once again conducted a competition in which the winners received an invitation to join the Dinosaur Dreaming crew for two days. Sam Arman and Ben Hopper were given a conducted tour of the site by Dr John Long, Head of Science at Museum Victoria before joining the crew for dinner. On the second day Sam and Ben helped us break rock before heading back to Melbourne.

In July this year Parks Victoria closed The Caves carpark in order to reconstruct the access route to the beach. The original access followed the cliff edge to a wooden bridge, followed by a set of wooden steps down to the beach. The

local rangers decided that the cliff edge was becoming unstable and the wooden bridge needed replacing. So over a period of 6-8 weeks they built a new set of steps from the back of the carpark, well away from the cliff. They replaced the old wooden bridge with a very sturdy galvanised iron bridge, which they reckon will last at least 30 years, and they replaced the steps down to the beach. Discussion with senior Ranger Brian Martin is taking place to decide where the four interpretation panels that were constructed in conjunction with Parks Victoria and the Dinosaur Dreaming team will be placed to best effect. Hopefully they will be in place by the time Dinosaur Dreaming 2009 comes around.

In the 2007 annual report, I included a report on the discovery of Pleistocene bird tracks near Tarwin Lower by Eulalie Brewster, an Inverloch naturalist. Subsequently Eulalie contacted me to correct my assumption that she had found the tracks. She informed me that the tracks were in fact discovered by Arnold De Merlo, a local farmer. It was Arnold that took Eulalie and three other field naturalists to the site.

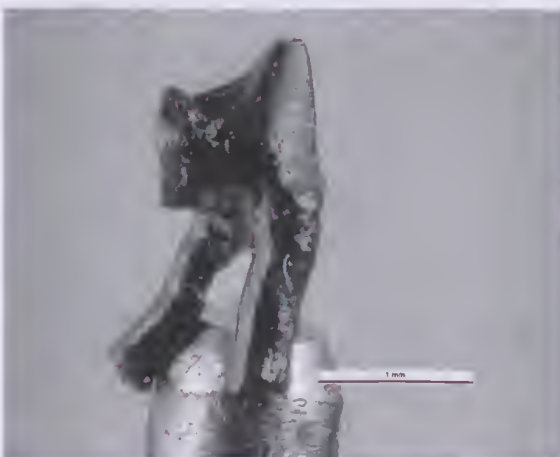
Finally it is my great pleasure to announce that Nicola Sanderson, the lady who found the first mammal jaw back in 1997, and her wonderful husband Dale are expecting their first baby in March 2008. Congratulations to them both. It could not have happened to two nicer people, although some of us think that it is just an excuse not to join us for Dinosaur Dreaming 2009.

## Research Report

by Tom Rich

On the morning of 8 March 1997, Nicola Barton was breaking up rock from the Flat Rocks site in the backyard at 23 Lavington Street, Inverloch. Doing that, she broke open a walnut-sized piece that fundamentally changed the course of the work at Flat Rocks. Instead of the project being ended there after the season the following year as was planned at the time, it continues to this day. What she found was the first mammal specimen with teeth like those of a placental to be discovered there or anywhere else in Australia in Mesozoic rocks.

On the tenth anniversary of that discovery, Nicola Sanderson nee Barton was breaking up rocks in the backyard at 23 Lavington Street, again in the morning. She broke open another rock and spotted a tiny mammal tooth about the size of a large sand grain. While during the intervening decade more than 40 mammal jaws had been found at Flat Rocks after her initial discovery, only a few fossil specimens from other parts of the mammal skeleton had been recovered. This preponderance of jaws over other parts of the skeleton of mammals in some fossil collections i



Nicola Sanderson's enigmatic mammal tooth found during the 2007 season.

s a not too unusual phenomenon although certainly most sites have other bones as well. But where this pronounced bias does occur, it will now be known as the "Samson Effect" to be so named in a paper about to be published concerning the Cretaceous mammals of Victoria. For those who wish to understand the derivation of the term, see Judges 15:15-16 King James Version, Holy Bible.

Nicola's second discovery overcame the Samson Effect operating at Flat Rocks because her isolated tooth was from the upper dentition, the first such specimen from there. Because the shape was so seemingly unremarkable, it was a year before the time was taken to try and identify it. When that process started, because the form of the tooth was so simple the thought was that many different groups of mammals would have teeth like it and thus little more could be said about it beyond "upper mammal tooth". However, when the time was finally found to investigate it, it turned out that only one group of mammals has teeth like Nicola's tooth. They are the placentals, the same group to which Nicola's first specimen was tentatively referred much to the dismay of many palaeontologists who still cannot entertain the idea that a placental existed in Australia during the Mesozoic. They may well prove to be right in the end. This is why the search continues to settle this fundamental debate about the course of mammalian evolution. The new specimen does not clinch the argument that placentals were in Australia during the Mesozoic but it certainly adds a new line of evidence that either they were or there was an entirely otherwise unknown group of mammals that superficially looked like placentals on this continent. Either way, Nicola's second discovery, like the first, is ground breaking in that it shows that upper teeth of mammals can be preserved at Flat Rocks and now if a technique can be developed to systematically duplicate Nicola's feat, more can be found there. In the case of her first discovery, the change in procedure was to break the rock down to a smaller size. That proved quite effective for in the years to follow two to four mammal jaws were found at Flat Rocks annually. As yet no one has suggested an alternative approach which would yield more isolated teeth for nothing as obvious as reducing the rock to the size of sugar cubes as was done after Nicola's first find is apparent.

Nicola's parting comment about her latest discovery was that she will be back on 8 March 2017 "...to do it again". Everyone associated with the project awaits the morning of that day. Perhaps she will then find the first long sought mammal skull from Flat Rocks.

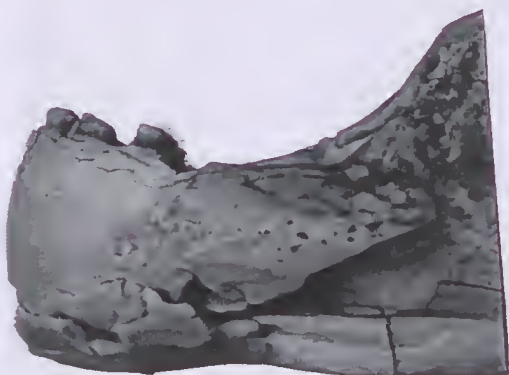
Mike Cleeland has been a stalwart supporter of the Dinosaur Dreaming project for not just years but decades. The results of his constantly patrolling the shore platforms flanking the Strzelecki and Otway ranges can be seen in the many twin cross markings where he has spotted and subsequently extracted a fossil using his trusty petrol driven rocksaw. Despite all those years of previous effort, he finally managed to cross a threshold this year that had been denied to him up until then. This was the discovery of a mammal jaw! It was one of the monotreme *Teinolophos* which was more water worn than most specimens. But the quality of preservation of the bone was such that despite it having been significantly abraded, it displayed features that are most important in attempting to resolve an ongoing debate about *Teinolophos*. All living mammals including the monotremes have three tiny bones linking the ear drum to the sensory tissue that converts the mechanical vibrations detected by the ear drum to nerve impulses that then go to the brain. In reptiles, on the other hand, there is only a single bone making that connection. The other two bones are part of the lower jaw and provide the link between the lower jaw and the skull. In the ancestors of mammals, which are not mammals themselves, the condition of those bones being in the lower jaw also prevails. A few fossils are known in which, while the bones in question are still in the lower jaw, they are so reduced that for the most part the connection between the lower jaw and the skull is formed by the dentary as in you and I. As *Teinolophos* seems to be not only a monotreme but one with a greater similarity to a

platypus than an echidna, it is to be expected that like those animals and all other mammals that are known, it, too, would have the advanced condition of three bones linking the ear drum and the sensory tissue.



Stereo image of the *Teinolophos trusleri* lower jaw found by Mike Cleeland.

However, recent examination of Mike's specimen with a CT scanner in Canberra confirms that what was thought before to be the case but has been disputed in the scientific literature, *Teinolophos* unlike other monotremes, evidently did have only one bone in the middle ear, the other two being part of the lower jaw.



CT scan of part of *Teinolophos trusleri* lower jaw.

Caroline Ennis, a veteran of many years of breaking rock at Flat Rocks obtained her third mammal jaw during the summer of 2008 about the same time as Mike Cleeland. It, too, is a *Teinolophos* jaw which is slowly coming to light under Dave Pickering's skilled hands. Who can say what surprises it might hold when fully exposed to the light of day after having been entombed for 115 million years?

In late September 2008, Paul Barrett of the Natural History Museum, London, spent a week in the preparation laboratory in the basement of the Royal Exhibition Building where Dave Pickering prepares fossils. Paul devoted much of that week to studying the ankylosaur material from four sites in the Inverloch area and from Dinosaur Cove. On the basis of the structure of the teeth, he concluded that the Victorian ankylosaur is not *Minmi*. *Minmi* is in a different family of ankylosaurs, the Ankylosauridae, while the Victorian form is a member of the Nodosauridae. The most

obvious difference between complete skeletons of the two families is that the Ankylosauridae have a tail club and the Nodosauridae do not.

Matt Herne, writing a dissertation on small ornithomimid dinosaurs under Steven Salisbury of the University of Queensland made two visits to study the hypsilophodontids in the Victorian dinosaur collection. By carefully examining elements of their skeletons that have not previously been carefully studied, Matt hopes to significantly refine the analysis of these specimens that have been published to date.

Matt Herne and Paul Barret independently concluded that the partial skeleton found at Eric the Red West in 2006 is more likely to be a small theropod than a hypsilophodontid. If that proves to be the case, it gives the project its first theropod specimen that consists of more than a single bone or isolated tooth. The two of them also unbeknownst to the other, suggested that an isolated vertebra from near Eric the Red West is likely to be a juvenile sauropod. If so, it is only the third occurrence of sauropods in polar regions, the other being the Middle Jurassic *Rhoetosaurus brownie* material from near Roma Queensland and some isolated teeth from the Early Cretaceous of eastern Siberia.



Possible juvenile sauropod vertebra found by George Caspar at the Eric the Red West site in the Otway Group.

About 17 km north east of Flat Rocks is a road cutting near the hamlet of Koonwarra. In the 1960s, widening of the South Gippsland highway brought to light rocks of the same age as those near Inverloch. But there is a significant difference between them. While those Cretaceous rocks exposed along the coast between San Remo and Inverloch represent deposits laid down either in actively flowing streams cutting across a flood plain or as overbank deposits on that flood plain, the sediments at Koonwarra were laid down in a lake with virtually no current. Rather than sands and conglomerates as along the coast, the sediments at Koonwarra are siltstones that occur in part as finely laminated shales. Breaking open those shales has revealed a plethora of fish, insect, and plant remains quite unlike what is found on the coastal exposures. The only tetrapods found at Koonwarra are the rare remains of tiny bird feathers. Although deposited in water, as yet Koonwarra is remarkable for the complete lack of turtles much less dinosaurs, pterosaurs and mammals.

Although there are large collections of fossils from Koonwarra already, because of the manner they were excavated, information relevant to their mode of accumulation cannot be extracted from those fossils. This is because the kind of data required simply was not taken at the time for then people were not making studies of that nature. Because of that absence together with a desire to see if more different kinds of insects occur at Koonwarra, Sarah Martin wishes to reopen the Koonwarra site. Sarah is about to complete a Ph.D. dissertation concerning Jurassic insects from a site in Western Australia.

To accomplish this, in December Sarah will excavate a short adit or tunnel with one entrance at Koonwarra. This will enable her to gain access to fossils deep underground where it is possible they will be better preserved than those found in the past close to the surface. Should Sarah do what nobody else has managed to accomplish at Koonwarra and find perhaps a bird or pterosaur, it is far more likely to be an entire skeleton rather than a single bone. In that eventuality because vertebrates are not Sarah's primary interest, no doubt there are others who would be happy to assist her in the study of any such fossil. If she is fortunate enough to find one.

### A Dig Report Epic Saga or Who me!?? by John Wilkins

Seeing I was graciously allowed to subjugate our loyal crews to 3-4 weeks of Hole Mastery, combined with the input and guidance from those more knowledgeable and experienced than myself, I humbly present the following for your understanding, insight and, hopefully, entertainment into the operation and excavation of the Inverloch Flat Rocks fossil locality granted under the Parks Victoria Permit 10003392.

#### Method of excavation or... The Inverloch Beach Gym Members only

Water was pumped out of the excavation areas using the 2 stroke water pump for large volume areas and the small 12V electric pumps for water pockets and the continual run in. Both pumps employed filters on the inlets to exclude materials from the uptake; basically shade cloth on the 2 stroke inlets and fabric filter "socks" for the smaller 12V pump head units.

Sand and debris were removed by the brute force and determination of the trusty crews throughout the dig using shovels and buckets. Overburden was removed using jack hammers, sledges and chisels as needed and was carted away manually.

The fossiliferous material was removed using sledges and hammers. For fragile or unstable fossil material the Stihl Quickcut rock saw was employed to first cut the around the specimen to reduce the possibility of breakage and then hammers and chisels were used to remove the block - hopefully in one piece.

The extracted material was then either broken up on the shore platform by our expert crews or lugged up the cliff side Sherpa style for storage and later broken down by our intrepid crew of fossil freaks at the rented house in Inverloch.

#### Equipment:

As in previous years the same equipment was used:

**Petrol powered Equipment :**  
STIHL Quick Cut Rock Saw with new diamond blade, two Cobra jack hammers with spade and drill bits and 2 Stroke water Pumps - all using 25:1 Two-stroke mix (we've standardized the fuel mix )

**Also..**  
12V electric boat sump pumps powered by 12V lead acid gel cells, and a variety of hammers, chisels, sledges, spikes, buckets, brooms, and various other hand tools.

Special thanks go to David Shean and Paul Chedghey for their support and upkeep of the equipment both during the field season and out side of it.

#### Dave's "Bazooka"

Special mention should also be made of David Shean's research and persistence in designing and building a dredge system that was trialed in the last dig day, while not yet to a working standard for the pumps we are currently running,

further investigations are underway into pumps and dredge design for future trialing to enable the extraction of, not only the water, but also sand and debris from the site.

Debris up to 10mm in diameter was seen to be extracted but removal was a slow process as constant agitation of the sand and debris was necessary and the suction was insufficient due to the large diameter of the dredge. Our small pumps were incapable of reaching sufficient vacuum / speed to be more efficient than current digging / manual labor methods, but we're working on it.



John Wilkins (right) testing David Shean's "bazooka"

#### Excavation Areas

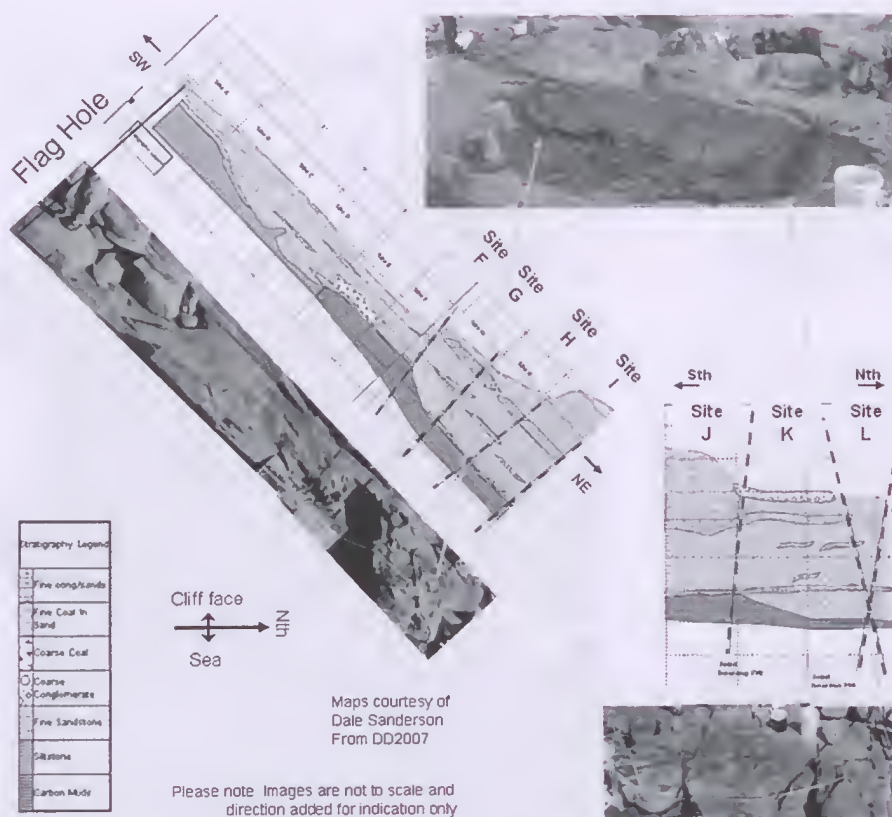
##### Prep Rock Sub-Site:

I had read Dale Sanderson's report but getting down there and starting the first week gives you a lot of things to think about - therefore we started at what was the easiest and , unfortunately, probably the least productive site the South West face of Lesley's Prep rock .

After years of precious fossils being brought up and placed upon it, the edifice has finally fallen and been broken up by the very team who used to bring up their small but sacred offerings.

We started at Site G (refer Dale Sanderson's Geological Maps Dinosaur Dreaming 2007 annual report) and quickly worked our way around to Site L and onwards which produced a number of bones, including some isolated dinosaur teeth, a hollow limb and a toe bone in the Upper Conglomerate near the coarse to fine conglomerates indicated near the bisecting fault - as per Dale's report we could use site K on a short day's dig.

The Lower fine conglomerate which makes up the majority of Prep Rock produced only little fossil material. This fossil layer erodes away into "Normans Hole", which has been dug previously with little result.



Prep Rock Sub-site, showing area excavated during Dinosaur Dreaming 2008 field season. Dale Sanderson's map was used to compare the different layers within the sub-site.

Although no further excavations are planned during the 2009 field season, this area will not be abandoned, and we will return to Prep Rock in the future.

### The Bridge Sub-Site:

The Bridge Sub-Site encompasses the western edge of the Main part of the fossil layer and the east side of the sand bar cutting north/south, which had been used to support the previous constructions used in Main

Bridge sediments are typically coarser conglomerates, which break very easily when first exposed but then turn to concrete when dry, large bones (well, for us) are found in this as well as turtle carapace with vertebra.

A number of fossilized trees have been identified found in situ in the north east corner of the Bridge, running through to the south face of the Pond and Bridge excavated areas. Large pebbles were exposed on the north east surface and a layer of very loosely packed together material that I can only describe, and taken the liberty of naming, as "Popcorn Rock" because of the small size rubble it disintegrates in to, even when handled lightly.

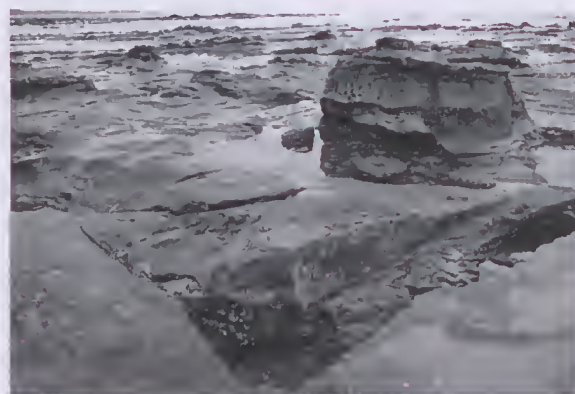
So far, we have only worked on the east side of the Bridge leaving the actual bridge intact. We wanted to maintain a barrier to stop sand and rock material from invading the continuously developing excavation area. Mary's reference point, used to measure the position of the fossil material and the boundaries of the layers, lies to the west of the Bridge but it may have to be relocated soon as this is an easy area to work in. So one of the first things we'll have to do next season is create a new reference point pronto.

### Bridge East Sub-Site:

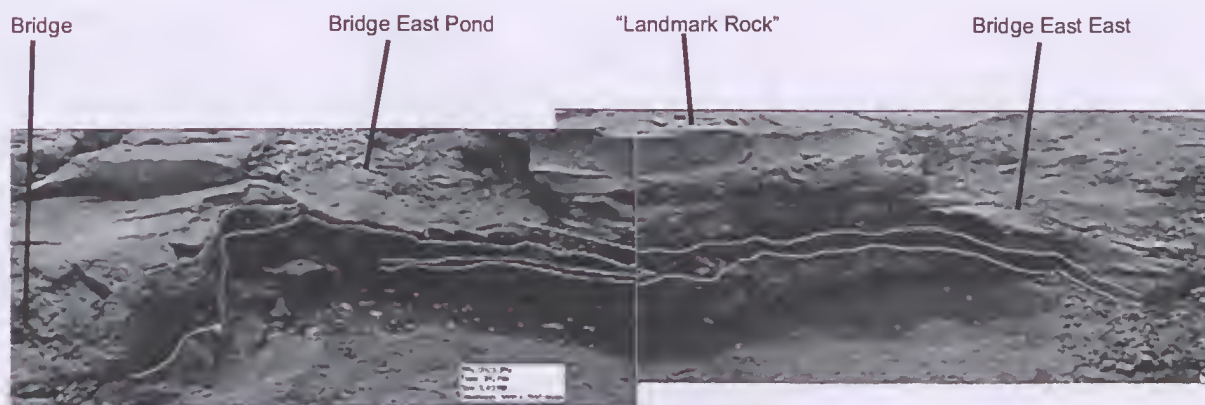
Bridge East is thought to be a continuation of the layer that goes down into "Main" Sub-Site and appears to rise slightly into a thin, fine layer at the eastern edge of Bridge East Sub-Site. I pulled Lesley along a couple of times to confer and believe the consensus was that it was thinning to an unproductive point, however it is readily accessible and can be excavated in the hope of a spectacular find .... Here's to dreaming :-)

Bridge East has been subdivided into two separate areas: (see Map Of site)

**Bridge East Pond** includes the area adjacent to Bridge and Landmark Rock, which received its name back in 1992 during the first excavations of the site. It was designated the most easterly point of the fossil layer and all fossils discovered that year were "west of Landmark Rock". This year Bridge East Pond produced a large amount of fossil material our Precioussss, including a number of mammal jaws. A number of large bones were also found at both the upper and lower contact levels of the fossil layer and the sandstone layers above and below it. The conglomerate layer was not as coarse as Bridge but definitely covered a wider area.



View of Bridge East Pond and Landmark Rock before water was removed



Eastern-most section of the Flat Rocks fossil locality - from the east side of "Bridge Sub-Site" to "Bridge East East Sub-Site"

### Bridge East East Sub-Site:

As with Bridge this area produced some of our larger specimens, including an ornithopod femur and tibia. The most easterly edge of the layer turns up and thins out to a small layer which does not seem profitable to work.

As with the rest of the layer the lower sandstone sits on a thick layer of coal above the mudstone and a number of bones were found just above this boundary. The coal can be easily dug out to allow the whole face to be moved away and the lower sandstone removed.

This helps to increase the depth at the lower point of the Bridge East site and allow water and debris to accumulate down lower, away from Bridge/Pond sub-sites.

Although having said that the tip thins out to an unprofitable edge, Dave Pickering pulled some interesting material, including a turtle braincase, out of the very end of Bridge East East, just showing that where there's conglomerate there's always the possibility of a good find!!



Crew members Astrid, Jeremy and Dave excavating the Bridge East East Sub-Site

### Conclusion - Past , Present and Future < or the shortened version ....> :

No construction was used to exclude sand from the target area, however the crews did exceptionally well to uncover the area in preparation for the search and extraction of our prehistoric fauna in a suitable time frame to allow adequate time to extract the fossiliferous material.

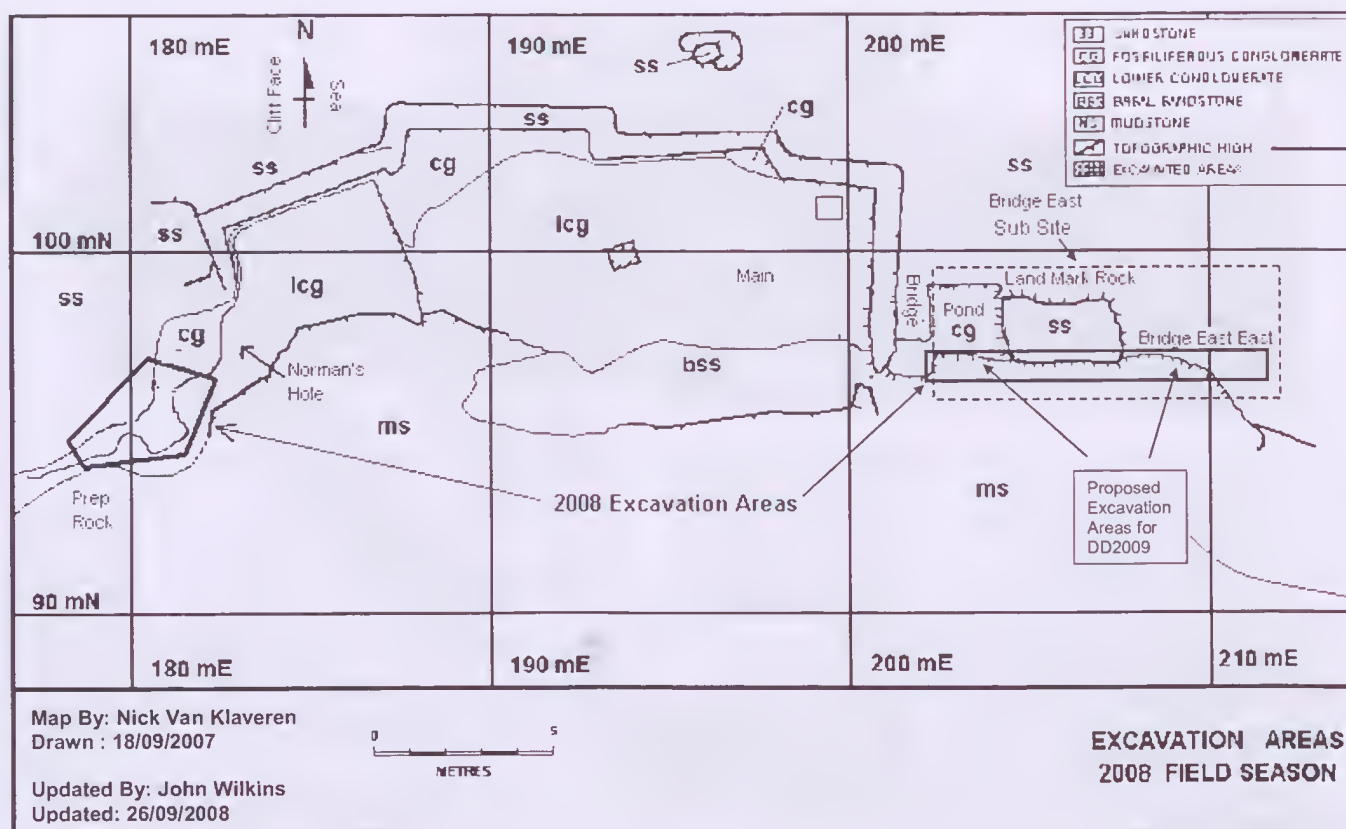
Work on the Prep Rock sub-site was a little disappointing, however, as shown by the work done on Bridge East East the only way to totally exclude missing any unique find will be to remove the entire conglomerate layer. This will be much easier and more accessible than the work required for main or Bridge locales and may be good for short days or one day digs.

Mammal jaws from Bridge/Bridge East, coming from the southern edge of the Pond sub-site, suggest that this is a very productive and worthwhile area for excavation. Large limbs have also been found at the upper and lower boundaries of the conglomerate layers. Natural erosion has removed some of the overburden at the Pond and mechanical erosion has whittled down "Landmark Rock", though further removal will be required, all adding to a highly promising site for DD2009 - fingers crossed.

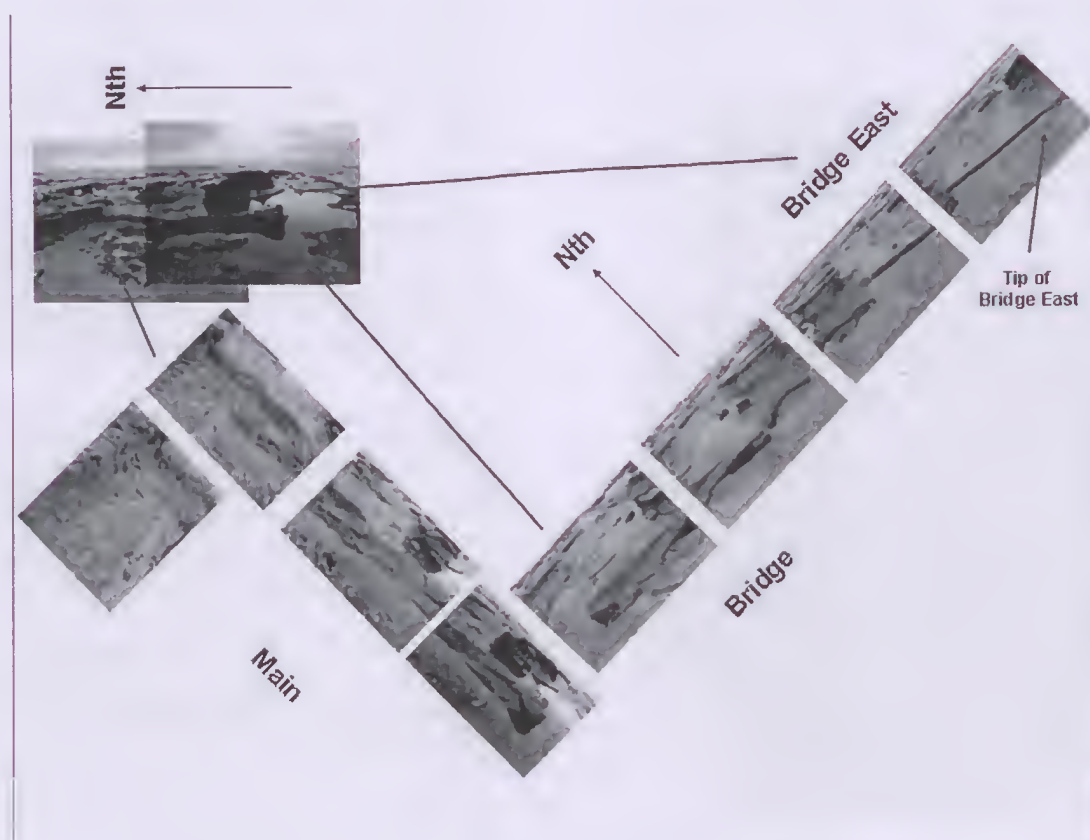
The lensing out of the most easterly end of Bridge East East means we'll continue heading north following the dip and observe which way the edge of the lens travels. If we are to follow the current layer this will mean removing a great deal of sand and debris and pumping out a lot of water. Back breaking and slow work but, and there's always a "but", ways and means are being trialled to reduce this labor of love.

A construction would be useful, though not necessary for DD2009, to exclude the debris and sand from the excavation area as well as reducing the amount of work required to prepare the work area and keep back the ever increasing amount of surrounding sand and debris. Unfortunately this would not keep the water out therefore necessitating the need of sumps and pumps to keep our happy diggers dry.

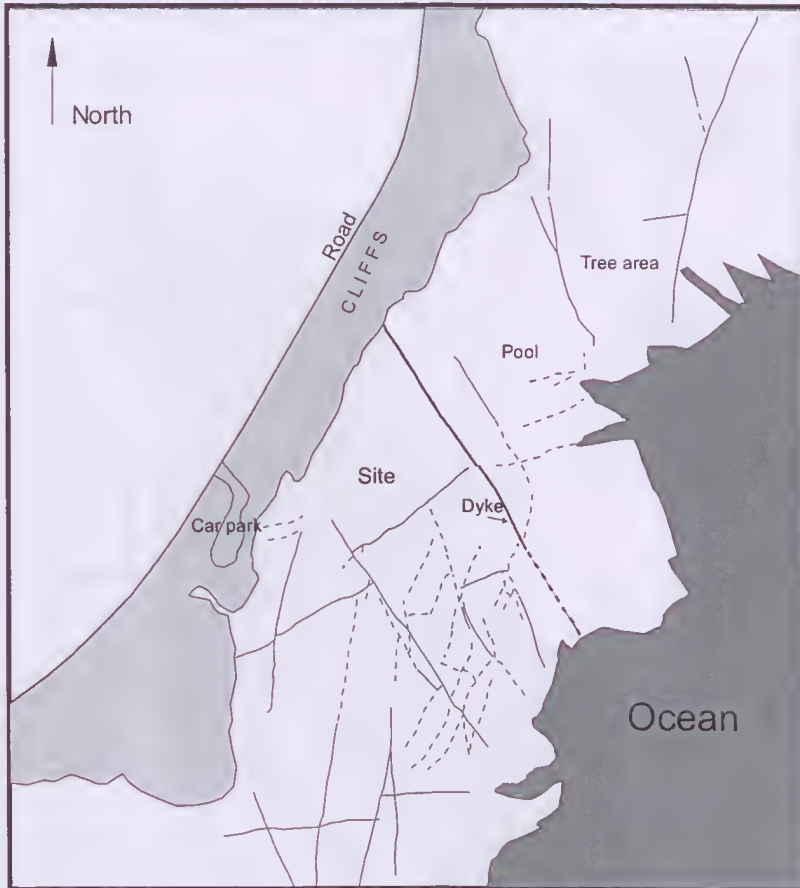
For DD2009 current methods are adequate to access the fossiliferous materials at this time, it being a trade off between initial setup, daily removal, tidy up and replacing of a system versus that of simply pumping water and shoveling debris & sand.



Map of the Flat Rocks excavation areas 2008 including Prep Rock Sub-Site at western end of site; Bridge Sub-Site; Bridge East Sub-Site, including Bridge East Pond, Landmark Rock and Bridge East East. Proposed excavation area for Dinosaur Dreaming 2009 is indicated by solid lined rectangle encompassing southern edge of Bridge East Sub-Site.



Compilation of images showing the different Sub-Sites within the Flat Rocks site, Inverloch.



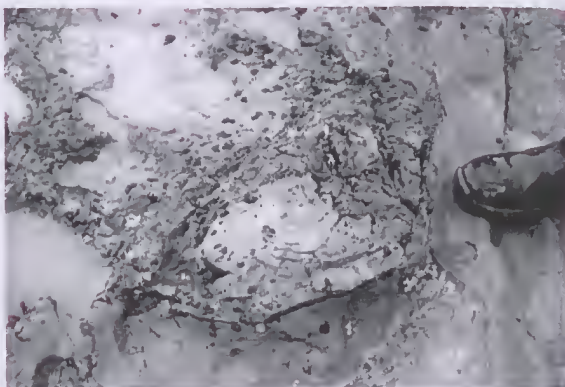
Map of the Fossil Site, indicating the pool and tree area. Dark continuous and dotted lines indicate fault lines

## Tree Stumps and Charcoal

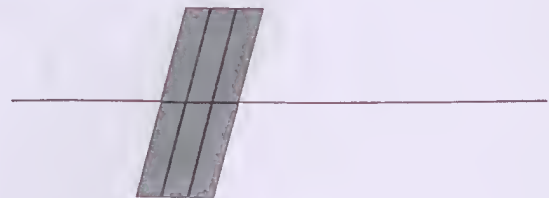
by Doris Seegets-Villiers

Plant material is a frequent component of the sediment in and around the Flat Rocks Fossil Site. The remains can range from tiny plant specks of unknown affinity, rare leaves, coalified twigs as well as complete logs and trunks.

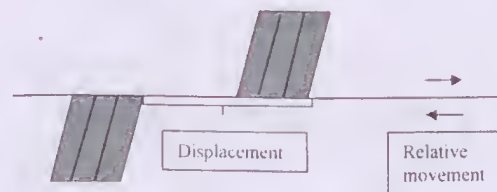
The area most productive of silicified tree trunks (trunks with internal structures still preserved) lies about 200m north of the pool (see map above). This section of the shore platform is littered with small tree stumps but also houses one of the largest trunks of the area, the so-called fault tree trunk. Horizontal displacement (faults) has frequently occurred in the area, manifested as "lines" that look like cuts in the sediments. One of these faults has displaced parts of this large overturned trunk and provides a measurement of the amount of movement that took place, roughly 70 cm.



Silicified tree stump in situ



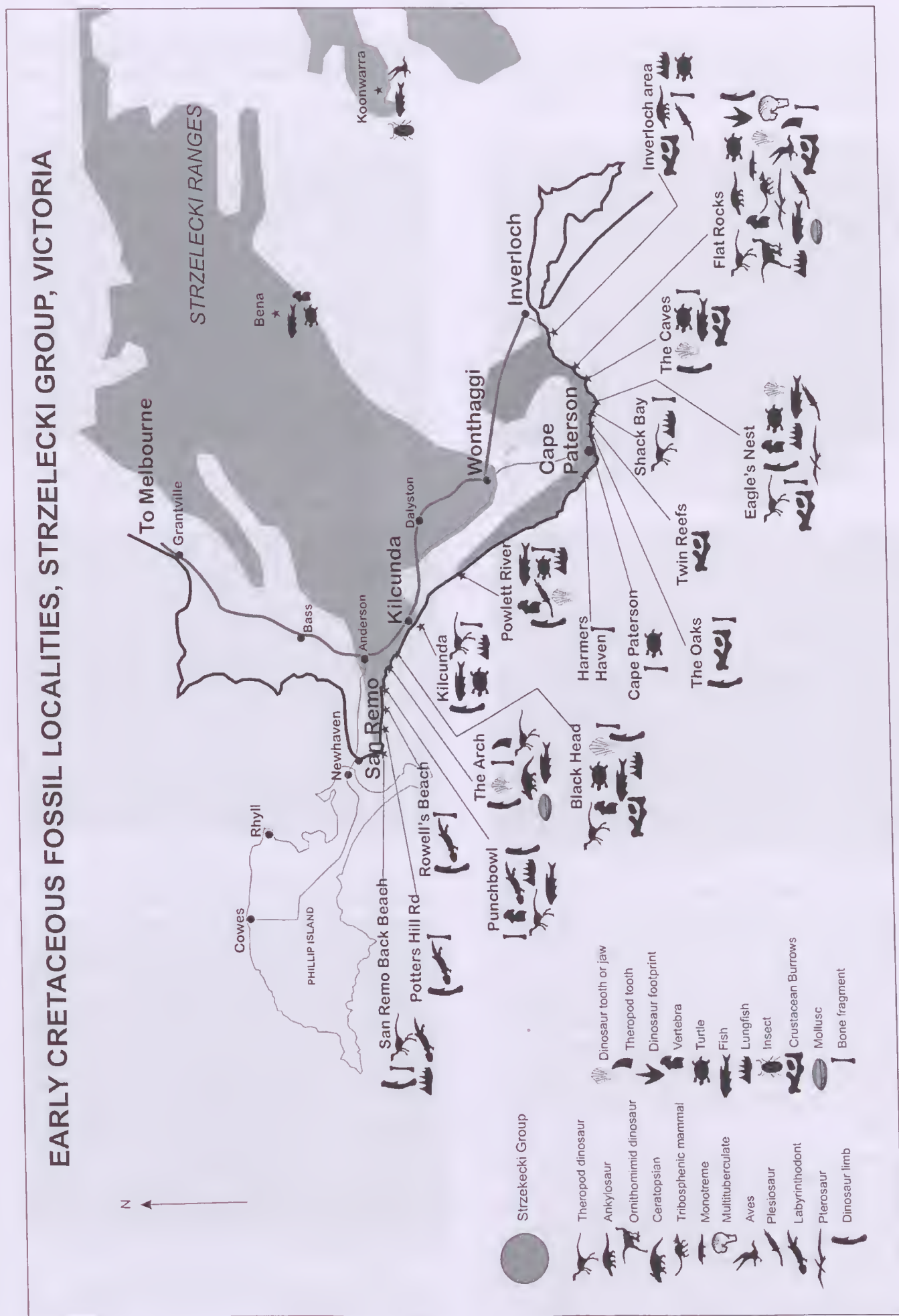
Silicified Tree Prior Displacement



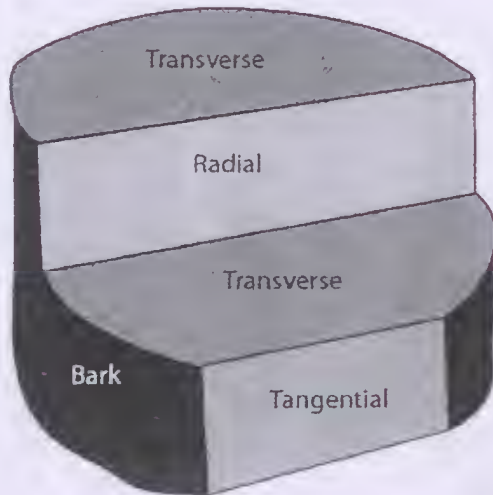
Silicified Tree After Displacement

# EARLY CRETACEOUS FOSSIL LOCALITIES, OTWAY GROUP, VICTORIA





Each individual stump gives us information on the age of the tree and type so reflecting environmental conditions and climate. In order to attempt to extract information from these trunks one needs to slice the fragments into three distinct sections:



First we need to slice any given fragment of tree into three distinct section:

(TR) Transverse,  
(RL) Radial and  
(TL) Tangential.

The transverse section (TR) is cut at right angles to the length axis of a tree, in the manner a lumberjack would cut a tree. In this section, growth rings can be counted and the minimum age of a tree establish. This also allows consideration of environmental conditions, the length of a growth season and how rapidly a growth season come to an end by examining the width of the individual growth rings.

Radial and tangential sections are utilized when trying to establish the relationships of fossilized trees based on their cellular structure.

David Cantrill (Chief Botanist at the Royal Botanical Gardens, Melbourne) confirmed that most of the tree fragments are too badly distorted to be of any taxonomic value (i.e. allowing an identification of the type of tree represented in a fossil remain) or environmental assessment. The tree remains possess small cavities in the timber filled with minerals such as laumontite or zeolite and a few with infill of silicate. As diagenesis occurred the space in-filled with the "softer minerals" collapsed while the silicate infilled sections remained intact. As a result, only the silicified tree trunks are identifiable and zeolitic and laumontic trunks are impossible to identify. So far, we have not been able to generate thin section that provide us with enough information to positively identify any of the tree remains.

All was not bad news however....

There were three very small fragments with a potential for an identification. These show well developed rings, subdivided into early and late wood. The early wood is much wider than the late wood, which is usually only a few cells wide indicating a quick shut down. This move towards dormancy was most likely caused by a combination of the onset of winter and the rapid drop in temperature and/or the start of polar night. The latter could have been at least 1 month during winter at the latitudes proposed for the site (Rich et. al., 1988). Unfortunately, at this stage we can not

evaluate if one of these parameters had a more prominent influence over the other or if they were equally significant (McLoughlin et al. 2002).

Further investigation was also suggested for the big fault tree trunk. This particular trunk is exceptionally hard and very difficult to cut. When thin-sections were cut not only did sparks fly but the saw used came to an almost complete stand-still at several occasions.

This trunk is not one of the "ordinary" conifers with concentric growth rings, but rather shows small fan-like sections indicative of something new. Further study is needed to sort this one out.

#### Charcoal

The microfloral assemblages have provided a picture of the vegetation occurring during the Early Cretaceous at the Inverloch Site. But how does the microfossil record compare to the macrofloral record? Fortunately, Rem Schouten, a Dutchman working in England has offered some insight. He has provided some beautiful SEM photographs for this report that allows for some comparisons to be made.

The microfloral assemblage has a high percentage of gymnosperms, including several taxa of podocarps and araucarians along with two groups whose relationships are uncertain. There is a high percentage of one particular pollen type, *Cycapodites nitidus*. *C. nitidus* has a simple morphology, and a relationship to a single taxon is difficult to ascertain. It is also not at all clear how individual pollen types relate to the categories of hard tissue observed in SEMs. What is clear is that there are two types of wood preserved in Rem's SEM's: araucarians and podocarps. Generally speaking, araucarians have larger and fewer rays in tangential section and alternate pits which are often hexagonal in outline in radial section. Podocarps exhibit narrower but longer sets of rays in tangential section and opposite pits in radial section. Perhaps further detailed study might allow further differentiation of taxa but linking of the pollen types with the timber sections is almost certainly impossible to achieve.

#### Age of the Site

The age of the site has to be slightly amended using the 2004 "Geologic Time Scale" and a Geosciences' Australia CD applying this time scale to the Australian Early Cretaceous, and microfloral assemblage of the site.

Three spore taxa play an important role: *Foraminisporis asymmetricus*, *Pilosporites parvispinosus* and *Cooksonites variabilis*. The timeframe is defined by the first occurrence of *F. asymmetricus* at the base of the *Cyclosporites hughesii* Zone and the last appearance of *C. variabilis* about 1my before the end of the same zone. This gives an approximate age of the site of between 116.5 and 125 my. There is a further limiting factor: the first appearance of *P. parvispinosus*, to be used with caution.

None of the samples examined contained a single grain of *P. parvispinosus*. It is possible that this fern had not yet evolved at the time the sediments at the Inverloch Site were deposited, but it is also possible that the environmental conditions were not conducive to growth of this form. If we assume that the absence is due to evolutionary trends, the age of the site can be narrowed down to Aptian or 125 to 120 my.

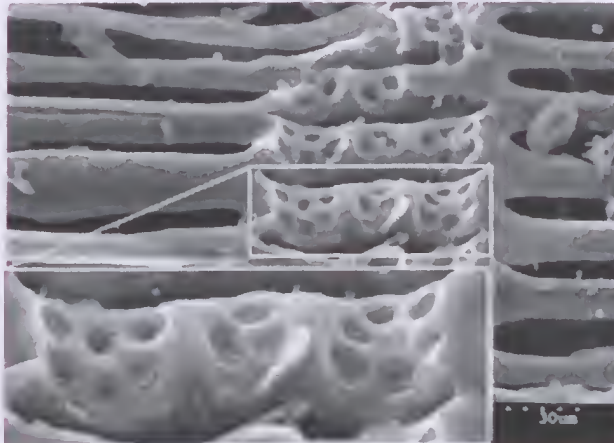
#### References

McLoughlin, S. et al. 2002. Early Cretaceous (Neocomian) flora and fauna of the lower Strzelecki Group, Gippsland Basin, Victoria. *Memoirs of the Association of Australasian Palaeontologists* 26: 1-144.

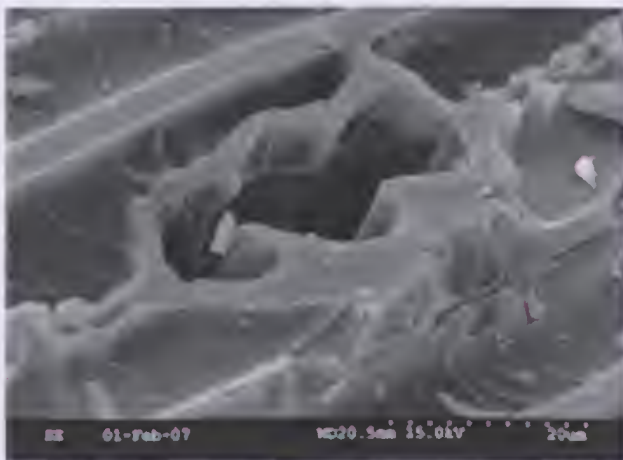
Rich, P.V. et al., 1988. Evidence for low temperatures and biologic diversity in Cretaceous high latitudes of Australia. *Science* 242: 1403-1406.

## SEM Images of Charcoal showing comparison between Araucarians and Podocarps

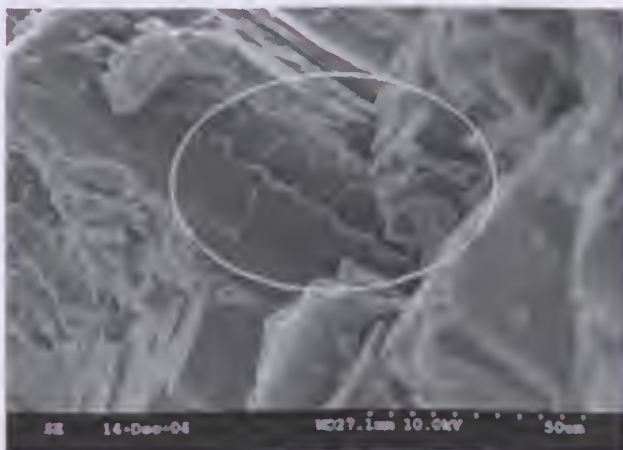
### Araucarians



Araucarian: Cross-field pits (the little indentations in the middle of the image) are alternating.

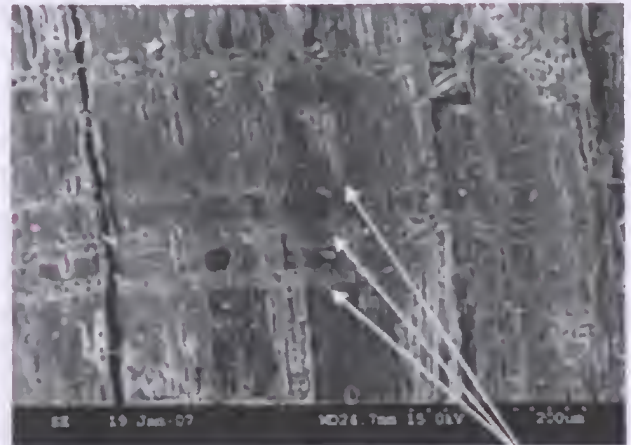


Araucarian: Rays (the three cavities in the middle of the image) are larger than Podocarps.

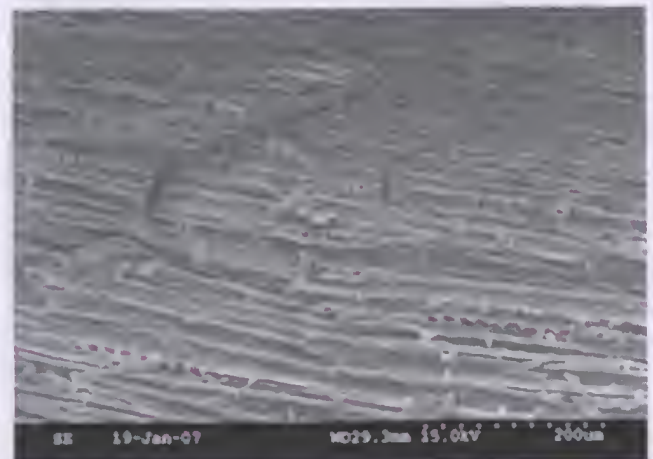


Araucarian: Double row of alternate, hexagonal pits

### Podocarps



Podocarp: Pits (holes running horizontally) are opposite each other



Podocarp: Rays are smaller than in Araucarians

## New Discoveries

by Mike Cleeland

2008 will probably be remembered as the Year of the Centrum in prospecting terms, notable for the discovery of both the largest ornithopod and temnospondyl vertebral centra that have yet come to light in the Strzelecki/Otway sequence. A steady flow of other bones from prospecting in 2008 confirms our earlier observations that known sites continue to produce bones as erosion uncovers them, and that occasional finds remain to be made in intervening areas.

Fieldwork in December 2007 in the Otways while working the Eric The Red West site resulted in the discovery of 2 more bones at the original Eric The Red site, together with more specimens uncovered at Point Franklin. Several fossil layers extending over a wide area promise to produce more bones in future from this site.

Following the discovery of a new fossil layer at Shack Bay in 2007, a prospecting team covered the area again during the 2008 dig season, but little erosion had occurred and no new material was found. This site has assumed new importance after the identification of two of the bones recovered last year, which preparation have now shown to be a very well preserved lungfish tooth, and a particularly robust frontal from the skull of a sizeable theropod dinosaur. These surprising results, from a site not previously regarded as deserving of the prospectors' attention, raise the possibility of further wildcat discoveries in other under-explored localities along our coastline.



*Theropod dinosaur frontal found by Mike Cleeland in 2007*

In the Strzeleckis, the prospecting focused on covering the section between The Punchbowl and The Arch. Rewarding discoveries were made in late 2007 in the cove to the west of The Arch, an area hitherto considered barren except for one ornithopod tibia collected by Andrew Constantine many years ago. New bones were also found at The Arch and in the cove immediately to the east.

Prospecting east from The Punchbowl led to the discovery on 15th May of one of the most spectacular specimens for

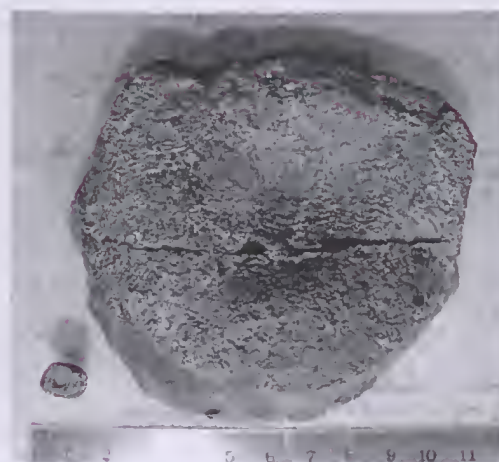
the year, a large ornithopod vertebral centrum comparable in size to the largest yet found in the Strzeleckis. The specimen was recovered nearly complete, having evidently only been exposed to erosion relatively recently. This encouraging trend bodes well for future prospecting, indicating that new bones are more likely than not to be found in, or close to, the condition in which they were deposited in the Early Cretaceous.



*Large ornithopod vertebral centrum from near the Punchbowl site.*

A lucky break in October 2007 saw much of the sand washed off the upper beach layer at the Powlett River site, allowing several new bones to be collected on 21st Oct but unfortunately not exposing the large, unidentified specimen, which was last seen in the mid 1990s. Its recovery and identification may have to await the next generation of prospectors, or the higher energy erosion events expected to accompany future climate change, or storms in these parts.

In August 2008 Connor MacQueen from Wonthaggi Secondary College joined in on work experience for a week and was immediately introduced to the gruelling task of carrying the rocksaw along the beach to the Powlett River site. Connor shouldered the burden with commendable youthful enthusiasm, notwithstanding the failure of the prospecting party to find the centrum, which was the object of the expedition. He backed up the next day with an expedition to Rowell's Beach to assist in the recovery of what Lesley initially thought may be the first specimen of turtle plate from that locality. However, on preparation, it turned out to be a small fragment from the skull of a temnospondyl amphibian.



*Largest and smallest temnospondyl centra yet found in the Strzelecki Group.*

At around the same time Andrew Ruffin discovered what is probably the largest temnospondyl vertebral centrum known from this area, which he found at San Remo Back Beach. Despite its size, the specimen was well disguised, poorly exposed and deceptively camouflaged amid the accompanying carbonaceous material. The discovery shows that not only can erosion expose new bones, but that previously searched areas may yet reveal more of the cryptic specimens that are sometimes, as in this case, among the most spectacular.

## My first visits to the Otway and Strzelecki Groups

by Alan Tait

### Eric the Red West site, the Otways

Having been confronted by a large koala in the road just outside the campsite, I settled into a caravan at Bimbi Park, ready for anything. Next day I saw the coast; beautifully exposed sedimentary rocks everywhere, even the smallest outcrop of rock larger than the 10 centimetre diameter borehole cores I'm used to working with. From working at the Eric the Red West site (formerly known as "Eric the Crayfish"); a trip to Dinosaur Cove courtesy of Tom Rich; a trip to Blanket Bay with everyone; various minor excursions along the coast and with the help and input of everyone during the dig, the following is my recollection of the story in the rocks.

In summary, the partial articulated dinosaur was a carcass washed along in a river flood until caught in a logjam formed against an in situ upright tree, and then buried by a sandbar migrating down the river.

At the Eric the Red West site, the partial articulated dinosaur was found in sandstone, which was deposited by a river and erosively overlies claystone. The claystone was deposited as the infill of an abandoned channel or on a floodplain adjacent to a river. The pale grey palaeosol at the top of the claystone indicates that eventually vegetation grew on the clay, including trees such as the in situ tree at the Eric the Red West site. The next recorded event was a major flood during which the river overflowed across the previous floodplain which by now had become a forest with trees at least four metres tall, judging by the lengths of the logs in the logjam. The trees in the forest represented obstructions to the flooding river and were removed by eddy currents scouring around their roots producing a scour hollow and eventually eroding under the root mass and floating the tree away. The in situ tree at the Eric the Crayfish site survived the flood but collected the debris; uprooted trees, floating roots first downcurrent, lodged against the upright tree and then swung to one side or the other, like outspread arms facing up-current that collected more drifted trees to form a logjam.



Eric the Red West site, showing in situ tree stump (dark triangle in centre).

As the flood waned, sand was deposited as sandbars and megaripples, which migrated downcurrent gradually burying the logjam. At some stage a dinosaur carcass drifted downcurrent into the logjam and was eventually buried by migrating megaripples of sand.



Lesley Kool, Matt Herne (from University of Queensland) and Anne Leorke taking measurements from the in situ tree at Eric The Red West.

The main current direction of the river is shown by the dip of the crossbedded sandstone, which engulfed the logjam, but the sandstone also records the local current directions in the scour hollow around the upright tree and close to the various logs where the current was diverted over and under the logs. The logjam not only collected large objects such as trees and a dinosaur carcass but also caused a series of scour hollows which trapped smaller plant fragments, smaller animal bodies and disaggregated bones of larger animals.

### Flat Rocks, Inverloch, the Strzeleckis

At Bimbi Park I'd been told many stories about how interesting the Flat Rocks site was, and they were all true. I was there for a few days early in the dig and then came back later for my allotted week.

As at Eric the Red West in the Otways, the Inverloch sediments were deposited by rivers. The power of the rivers is shown at the Flat Rocks site by the presence in many of the sandstones of numerous transported trees up to several metres tall with roots and attached soil acting to keep them upright. These are the result of river floods into forests, as at Eric the Red West, but at Inverloch the trees are all transported whereas at Eric the Red West the remaining in situ tree caused a logjam. As the flood waned and the transported trees were stranded on sandbars, the water flowing past formed scour hollows around them, which trapped clay clasts, plant fragments and bones. The transported trees occur in sandstone units up to around four metres thick that in vertical dip section (parallel to flow) have vague, low angle bedding indicating the high speed of the flood current which deposited the sand. At right angles to flow, the sandstone units show low angle troughs ('smiley faces') up to tens of metres wide which indicate that the sandbar had a large scale sinuous front as it migrated downcurrent.

At the Flat Rocks dig site, the base of the fossil-bearing sandstone sharply overlies a thin coal near the cliff but to the east cuts down into the grey claystone below the coal. This claystone is a floodplain succession of repeated thin soil horizons and contains the dinosaur footprint discovered in 2007. In the middle of the dig site, a lens of barren sandstone fills a hollow cut into the claystone, and sand also fills apparent cracks in the claystone surface. The hollow in the claystone surface may have been formed by the flood removing a tree with roots and attached clay soil,

and the apparent cracks (now sand-filled) may have been where deeper roots were ripped out as the tree was removed. The sand then filled the hollow and the fossil-bearing sand was deposited over the top.



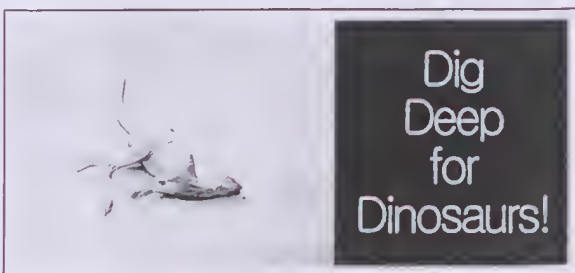
Alan Tait (on the right) discussing the fossil layer at Bridge East, Flat Rocks dig site, with David Pickering

The fossiliferous sand contains plant fragments, bones, and clasts of brown 'corky' claystone some of which contain turtle bones and unionid shells. The corky brown clay is thought to have been deposited at the bottom of an abandoned river channel where it was inhabited by unionids, stained brown by organic material (waterlogged plant debris), accumulated the bones of turtles that lived in the 'billabong' and of dinosaurs and mammals that fell in and drowned. The flooding river later reoccupied the billabong and eroded the clay in lumps along with its fossil content, and deposited the clay clasts, loose fossils and plant debris on a sandbar farther down the river (the Flat Rocks dig site) until the billabong was emptied. Thereafter only unfossiliferous sand was deposited downriver.

So, in the fluvial environments at Eric the Red West and Flat Rocks, fossils can be trapped in logjams, scoured out of billabongs and dumped farther downriver, or can accumulate in scour hollows around drifted logs and upright trees. I'm looking forward to returning to Eric the Red West and Flat Rocks to help find more fossils at the known sites and, hopefully, to discover more fossil localities and refine the sedimentological interpretation of the Otway and Strzelecki Groups.

### Dig Deep for Dinosaurs Report

by Alanna Maguire, Dru Marsh, Sarah Edwards and Wendy White



Election day 2007 saw the inaugural "Dig Deep for Dinosaurs" charity auction. It also marked the final ever charity auction! It was a great success and enjoyed by all that participated.

Springing from an incidental conversation over a few bottles of wine at a café in Wonthaggi, the fundraiser soon snowballed to involve a major logistical effort as hundreds of items were donated, catalogued and arranged for sale in the splendour of the Royal Society of Victoria.

The event brought together members of the academic world, fossil collectors, art lovers and general passers-by, while providing wonderful memories for the dig crew members who welcomed the excuse to get together outside of the dig season.

Donations for the auction were generous, boasting some beautiful examples from the fossil and publication records. Some contributions weren't completely fossilised but were closely aligned including dino-toys, dino-ties, dino-stickers, dino-books and even dino-shaped CD holders (there was no mistaking the theme of the event), many of which provided more flash than cash. No donation was too old or too used. The activity bags from the Great Russian Dinosaur exhibition of 1993 proved a great hit with the punters - at \$2 a pop, fierce competition for one of these gems was generated. There were even give-aways - one could take home a back issue of WA Museum's *Dinonews* from 1992 that included information on how to join their Dinosaur Club.

Amongst the highlights of items on auction were a signed monograph by Richard Owens and an original article by Alfred Russel Wallace, both donated by Erich Fitzgerald; an exquisite Ushabti from Egypt donated by Michelle Thompson and two gorgeous works of art by Douglas Stubbs courtesy of Norman Gardiner. Other highlights included a fascinating banded-ironstone necklace designed and created by Marion Anderson; two very impressive fossil ammonites and a cast of a fierce saber-toothed tiger (*Smilodon*) from Crystal World and a particularly fabulous consumable donation from Win and Pauli Chedghey.

However, the *piece de resistance* was the original sketch of our own *Leallynasaura amicagraphica*, generously donated by Peter Trusler, who is now also something of a radio star. There was much anticipation and rigorous bidding for the stunning Peter Trusler work, providing highlight to the auction with a breathtaking final bid bringing in the overall fundraising effort from the auction to just over \$11,000

Other fabulous artistic works included original images from Dr John Long, Andrew Plant (including a personalised original dinosaur painting) and some of the original dinosaur dreaming t-shirt designs from Brian Choo.

The silent and outcry auctions raised enough money to fund the 2008 and part of the 2009 Dinosaur Dreaming seasons. Witty introductions to the auction items were provided by Brian Choo, Erich Fitzgerald and David Pickering, but only after an awkward start in which Sarah stalled the proceedings to wait for the auctioneer, only to find he was at her side all along!

A huge thank you goes to Marcus and Rebecca Alexander, not only for providing a skilful auctioneering and spotting duo, but also for extreme generosity in both donating artworks as well as bidding for many an item.

Particular thanks also to Kim Davis for her months of planning and fundraising expertise; to Lauren Ellis for sourcing the evening's beverages; to Wendy White for her tireless cataloguing, IT consulting and general good humour; to Sarah Edwards for artistic direction and auction know-how; to Dave Pickering for helping everyone with everything; Priscilla Gaff for marketing and PR (and fabulous radio skills) as well as many others along the way and on the day. Without your help and support we would never have got there.

Finally, and most importantly, we must recognise the many supporters, sponsors and donors who enabled the afternoon to be such a success.

The event was very generously catered by Inverloch Foodworks Supermarket (who also look after us every year during the dig season) with some help from Steggles and Cadbury. The Tahlk wine was flowing courtesy of Red + White wine distributors.

Our heartfelt thanks also go to the following:

- Mike Cleeland's Southern Environment Contracting (who didn't know the half of his donation until he rocked up on a 40 degree day to honour his pledge).
- Inverloch Big 4 Holiday Park generously donated two nights accommodation
- Hedgend Maze, Healesville donated a double pass
- Luna Park, St Kilda free passes
- Sovereign Hill, Ballarat free passes
- Bosch tools
- Phillip Island Parks donated admission passes to their venues
- Nature's workshop, Northcote
- Rob Selecki donated a lovely Eocene fish plaque
- Lots of crew members of Dinosaur Dreaming past and present.
- Dr Tom Rich and Professor Pat Vickers Rich

### Dinosaur Dreaming 2008 Friend's Day

The weather on the annual "Friends of Dinosaur Dreaming" day was perfect; blue skies and not too hot. About 30 "Friends" made the trip to Inverloch and we hope they enjoyed their visit. Dinosaur Dreaming crew members were on hand to provide tours of the site and to show off some of the new discoveries.



Some of the "Friends of dinosaur Dreaming" given a tour of the site by crew members

### Dinosaur Dreaming Blog Site

by Wendy White

This year, we tried something new. We posted updates every couple of days during the dig to <http://www.dinodreaming.blogspot.com> And invited crew members to keep abreast of our goings-on.

The blog site allows us to be pretty informal; lots of silly, fun photos and a couple of veiled references designed mainly to amuse the crew! Nothing is sacred, we have John W. asleep on site with the jackhammer; John S. wearing swim goggles to cut onions, Mike C. being ignored whilst playing guitar, Gerry in the water with his socks on, and Mary wearing the *Koolasuchus* hat. Nothing too scandalous, of course. I promise...

Now that we've proven we can actually do it, we happily invite those of you with Internet access to view our blog for your continuing fix of the Victorian Cretaceous.

### Dinosaur Dreaming Anthem

by Nicole Evered

Under the Southern Cross we stand  
Hammer and Chisel in our hand.  
"Dinosaurs! Arise! Awake!  
Your bones we are about to take (...or break)"

We few, we very special few,  
Addicted diggers through and through.  
Great rocks we break to try and find  
Anything that they had left behind.

The bones and teeth are thus revealed,  
Though long millennia concealed.

Dinosaur Dreaming is the place  
We will find more, just watch this space...



Our wonderfully enthusiastic Nicole Evered reciting the Dinosaur Dreaming anthem at the "end of dig" party.

As mentioned at the beginning of this report, over the past 11 years we have recovered 45 mammal jaws from the Flat Rocks site near Inverloch. These jaws represent four taxa, including the ausktribosphenid mammals, a monotreme and a multituberculata. Some of the jaws are fragmentary whereas others are very well preserved. Below is the full list of jaws, excluding the isolated teeth and the only mammal jaw from the Otway Group.

|    |         |                                       |                                                     |
|----|---------|---------------------------------------|-----------------------------------------------------|
| 1  | P209090 | 1997 (#1111 N. Barton)                | <i>Ausktribosphenos nyktos</i>                      |
| 2  | P208228 | 1995 (#329)                           | <i>Ausktribosphenos sp.</i>                         |
| 3  | P208230 | 1994 (#560)                           | – jaw fragment                                      |
| 4  | P208231 | Nov.1993 (Mentor's trip)              | <i>Teinolophos trusleri</i>                         |
| 5  | P208482 | 1999 (#150 N. Gardiner)               | found in rock from DD1998                           |
| 6  | P208483 | 1999(#140 N. van Klaveren)            |                                                     |
| 7  | P208484 | 1999 (#450 K. Bacheller)              | <i>Bishops whitmorei</i>                            |
| 8  | P208526 | 1994 (#560)                           | <i>Teinolophos trusleri</i>                         |
| 9  | P208580 | 2000 (#200 A. Maguire)                | jaw fragment                                        |
| 10 | P208582 | 2000 (#500 L. Irvine)                 | Ausktribosphenid new species?                       |
| 11 | P209975 | 2000 (#387 R. Close?)                 | <i>Bishops whitmorei</i>                            |
| 12 | P210030 | 2000                                  | <i>Teinolophos trusleri</i>                         |
| 13 | P210070 | 2000 (Rookies Day 3.12.00)            | <i>Bishops whitmorei</i>                            |
| 14 | P210075 | 2000 (Rookies Day 3.12.00)            | <i>Bishops whitmorei</i> holotype                   |
| 15 | P210086 | 2001 (#250 J.Wilkins)                 | – jaw fragment                                      |
| 16 | P210087 | 2001 (#620 G.Kool)                    | – undescribed ausktribosphenid                      |
| 17 | P212785 | 2000 (Rookies Day 3.12.00 M.Anderson) | – fragment only                                     |
| 18 | P212810 | 2002 (#300)                           | <i>Bishops whitmorei</i>                            |
| 19 | P212811 | 2002 (#187 D. Sanderson)              | <i>Teinolophos trusleri</i>                         |
| 20 | P212925 | 1996 (#222)                           | edentulous jaw                                      |
| 21 | P212933 | 2001 (#179)                           | <i>Teinolophos trusleri</i> plus associated molar   |
| 22 | P212940 | 2003 (#171 W.White)                   | <i>Bishops whitmorei</i>                            |
| 23 | P212950 | 2003 (#292 C. Ennis)                  | <i>Bishops whitmorei</i>                            |
| 24 | P216575 | 2004 (#180 N. Gardiner)               | <i>Teinolophos trusleri</i>                         |
| 25 | P216578 | 2004 (#600 A. Leorke)                 | <i>Bishops whitmorei</i>                            |
| 26 | P216579 | 2004 (#635 N. van Klaveren)           | <i>Teinolophos trusleri</i>                         |
| 27 | P216580 | 2004 (#800 G. Kool)                   | <i>Bishops whitmorei</i>                            |
| 28 | P216590 | 2004 (#447 J. Wilkins)                | base of coronoid similar to P210087                 |
| 29 | P216610 | 2004 (#557)                           | <i>Teinolophos trusleri</i>                         |
| 30 | P216655 | 2004 (#142 M. Walters)                | Multituberculata. <i>Corriebataar marywaltersae</i> |
| 31 | P216670 | 1999 (#184)                           | Ausktribosphenid                                    |
| 32 | P216680 | 2004 (#132 R. Long)                   | <i>Teinolophos trusleri</i>                         |
| 33 | P216720 | 2002 (#648)                           | <i>Teinolophos trusleri</i>                         |
| 34 | P216750 | 2005 (#162 R. Long)                   | <i>Teinolophos trusleri</i>                         |
| 35 | P221043 | 2005 (#100 A. Leorke)                 |                                                     |
| 36 | P221044 | 2005 (#300 C. Ennis)                  |                                                     |
| 37 | P221045 | 2005 (#395 J. Wilkins)                |                                                     |
| 38 | P221156 | 2006 (#360 N.van Klaveren)            |                                                     |
| 39 | P221157 | 2006 (#585 M. Walters)                |                                                     |
| 40 | P221158 | 2006 (#200 R. Close)                  |                                                     |
| 41 | P221150 | 2006 (# 340 J. Swinkels)              | <i>Teinolophos trusleri</i>                         |
| 42 | P229409 | 2007 (#180 N. Evered)                 | Ausktribosphenid                                    |
| 43 | P229410 | 2008 (#90 C. Ennis)                   | <i>Teinolophos trusleri</i>                         |
| 44 | P229037 | 2008 (#91 M. Cleeland)                | unusual <i>Teinolophos</i>                          |
| 45 | P229408 | 2008 (#300 M. Walters)                | undergoing preparation                              |

## The Future 2009 and beyond

Thanks to the wonderful effort by so many people we raised enough money from the "Dig Deep for Dinosaurs" auction in November 2007 to fund the 2008 dig, with some left over to go towards the 2009 dig.

We are already planning a return to Eric the Red West in the Otways in early December. This will include part of the training of the new volunteers for the Dinosaur Dreaming 2008 field season. Tom Rich's report includes the recent research into some of the specimens recovered from this area, which has produced some surprising results, including the possibility of our first theropod dinosaur partial skeleton and amazingly, a possible juvenile sauropod vertebra. These two specimens alone provide huge impetus for the Dinosaur Dreaming crew to return to the Otways and find more.

It is unlikely that more excavations will take place at "Prep Rock" during the 2009 field season at the Flat Rocks site. This Sub-Site will not be completely abandoned, but at this stage emphasis on the Bridge East Sub-Site is a priority. It was from here last season that the three mammals jaws were recovered, as well as the first complete turtle skull and numerous dinosaur limbs. With only four weeks in which to excavate this area, we will be working hard to initially remove the remains of "Landmark Rock" to discover what is hidden beneath it.

The Dinosaur Dreaming 2009 field season will commence on Monday 2nd February and will finish on Friday 27th February. The shortened season will mean that we will need to be extremely organised to make the most of the time we have. However, we do intend to trial a number of initiatives, including David Shean's "bazooka" and retaining walls. The results of these trials will determine our course of action for the future as the fossil layer becomes increasingly deeper and more difficult to access.

## Acknowledgements

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This field season we were very fortunate to welcome a number of overseas volunteers as crew members. Alaskan, Bill Hopkins was mentioned earlier. As an ex-Dinosaur Cover, he knew the ropes and fit in very well. Hailing from a little further south of Alaska came Holden Hanna from Texas. Holden brought his surf board and made full use of the waves, when he wasn't looking for fossils. Rachel Jennings was our English representative. Rachel came from Bristol University and knew Rem Schouten (mentioned in Doris' report). Celeste Walker was from the North Island of New Zealand and although she was only with us for one week, she quickly picked up the routine and pitched in. Our final international guest was no stranger to the crew. Keiichi Aotsuka returned for his fifth visit to the dig and everyone was delighted to see him again. His presence was particularly welcome when we were visited by a reporter and photographer from the prestigious Japanese Journal "Pen". He also very kindly translated the article that appeared in the journal a few months later and sent us copies. Keiichi won't be joining us in 2009 as he has been accepted at a Canadian Museum. Although we will miss him terribly we are delighted to hear he has found a position in Canada.

We can not say "thankyou" too many times to all the sponsors and volunteers who gave us their precious spare time and donations to make the "Dig Deep for Dinosaurs" auction such a success. The funds raised made Dinosaur Dreaming 2008 possible.

One of the major sponsors of the auction was the Inverloch Foodworks Supermarket. When Dom and Tracie Brusamarello heard that we were organising a fund raiser they contacted us and asked what they could do to help.

Consequently they supplied nibbles and soft drinks, which were very gratefully received by everyone. This was on top of the generous discount on everything we need to feed our hungry crews during the dig.

As part of last year's fund raising effort we applied for a community grant from the Bass Coast Shire and received \$500 towards the support of the volunteers. This grant was much appreciated.

Once again Blundstone Pty.Ltd., generously donated 30 pairs of steel-capped safety boots for the Dinosaur Dreaming crew. Blundstone has been providing safety boots for our crews for a number of years now and we are very grateful for their continued support.

We appreciate the work done by Parks Victoria staff in making the access to the beach safer with new steps and bridge. Not only will the dig crew benefit from this, but so will all the visitors to the site. In the very near future they will be able to read about the site and the extinct animals that lived in that area millions of years ago, on the information panels that will be erected on the path down to the beach.

Of course a dig this size depends entirely on the volunteers who give us their time, enthusiasm and labour. Some join us for one week; others for two or three weeks. Then there are the crazy enthusiasts who come back year after year and make up our very special "core crew". Every last volunteer is important to the team effort and on behalf of the Dinosaur Dreaming project I thank them from the bottom of my prep kit.

Last but not least, we thank Bob and Bev Huntley and Bernie and Margaret Brown, long standing members of the "Friends of Dinosaur Dreaming", for all their assistance with the set up of the dig and contributions during the field season. Their help is always gratefully received.

### Crew Members on the "Eric the Red West" field trip in December 2007

Vicki Anceschi  
Hala Assouad  
Zeina Assouad  
Paul Chedgey  
Win Chedgey  
Mike Cleeland  
Richard Connolly  
Kim Davis  
Fay Dunn  
Geetha Edirisooriya  
Sarah Edwards  
Nicole Fournie  
Norman Gardiner  
Mike Greenwood  
Matt Herne  
Gerrit Kool  
Lesley Kool

Matthew Lambert  
Andrew Langendam  
Anne Leorke  
Rohan Long  
Peter Lynch  
Alanna Maguire  
Anthony Morton  
Jay Nair  
David Pickering  
Udo Polzin  
Troy Radford  
Tom Rich  
Heather Stewart  
John Swinkels  
Alan Tait  
Daniel Timblin  
Mary Walters  
Lindsay Ward  
Wendy White  
John Wilkins

### Dinosaur Dreaming 2008

Vicki Anceschi  
Marion Anderson  
Keiichi Aotsuka  
Hala Assouad  
Zeina Assouad  
Darren Bellingham  
Sheahan Bestel  
Jeremy Burton  
Paul Chedgey  
Win Chedgey  
Mike Cleeland  
Roger Close  
Peggy Cole  
Richard Connelly  
Anthony Dall'Oste  
Kim Davis  
Bernard de la Coeurr  
Fay Dunn  
Sarah Edwards  
David Elliott  
Caroline Ennis  
Alan Evered  
Nicole Evered  
Nicole Fournie  
Mark Hallinan

### Crew Members

Priscilla Gaff  
Norman Gardiner  
Jillian Garvey  
Tim Gatehouse  
Mike Greenwood  
Holden Hanna  
David Hocking  
Bill Hopkins  
Rachel Jennings  
Fotini Karakitsos  
Gerrit Kool  
Lesley Kool  
Matthew Lambert  
Anne Leorke  
Rohan Long  
Penny Loughran  
Alanna Maguire  
Sue Martin  
Catriona Millen  
Danielle Mitchell  
Anthony Morton  
David Pickering  
Udo Polzin  
Katerina Rajchl  
Doris Seegets-Villiers

Brian Shaw  
Danielle Shean  
David Shean  
Heather Stewart  
Andrew Stocker  
John Swinkels  
Alan Tait  
Jackie Tumney  
Alex Umbers  
Celeste Walker  
Lindsay Ward  
Mary Walters  
Wendy White  
John wilkins

Once again we were organised enough to get most of the crews together for their weekly mug shots. Hopefully we didn't miss any one out.



### WEEK ONE (Jan. 27th - Feb. 3rd)

Back row: Lindsay Ward, Heather Stewart, Roger Close, Hala Assouad, Mary Walters, Norman Gardiner, David Shean.

Middle row: Fotini Karakitsos, Brian Shaw, Rohan Long, Rachel Jennings, John Wilkins.

Front Row: Katerina Rajchl, Caroline Ennis, Anne Leorke, Gerry Kool

Absent: Alan Evered, Nicole Evered, Wendy White, Mike Cleeland

Photographer: Lesley Kool

### WEEK TWO (Feb. 3rd- Feb. 10th)

Back row: Anthony Morton, Mike Cleeland, Anthony Dall'Oste, Middle row: Jillian Garvey, Mary Walters, Norman Gardiner, Wendy White, Gerry Kool, Nicole Fournie, Andrew Stocker,

Front row: Nicole Evered, Katerina Rajchl, Rachel Jennings, Alan Evered, Rohan Long, Roger Close, Caroline Ennis, Jacqui Tumney, Anne Leorke, Lesley Kool, David Elliott, John Wilkins



### WEEK THREE (Feb, 10th - Feb 17th)

Back row: Holden Hannah, Bernard de la Coeur, Jeremy Burton. Third row: Nicole Evered, Gerry Kool, Alan Evered, Roger Close, Sue Martin, Marion Anderson.

Second row: Wendy White, Lesley Kool, Peggy Cole, Mary Walters, Rohan Long, Astrid Werner, Zeina Assouad,

Front row: David Pickering and Alex Umbers  
Absent: Anne Leorke, Norman Gardiner, Mike Greenwood, Mike Cleeland, Dani Mitchell, Mark Freeman



#### WEEK FOUR ( Feb 17th - Feb 24th)

Back Row: Bill Hopkins, Gerry Kool

Middle row: Roger Close, David Hocking, Paul Chedgey, Mary Walters, Penny Loughran, Matthew Lambert, Sheahan Bestel.

Front row: David Pickering, Win Chedgey, Anne Leorke, Celeste Walker, Wendy White, Nicole Evered, Alan Evered, Catriona Millen.

Absent: Mike Cleeland

Photographer: Lesley Kool

#### WEEK FIVE ( Feb 24th - Mar. 2nd )

Back Row: John Swinkels and Roger Close.

Middle row: Keiichi Aotsuka, Vicki Anceschi, Alan Tait, Alanna Maguire, Bill Hopkins

Front row: John Wilkins, Lesley Kool. David Pickering, Sarah Edwards, Mary Walters, Mike Greenwood, Wendy White, Kim Davis.

Absent: Anne Leorke, Nicole Evered, Alan Evered, Mike Cleeland.

Photographer: Gerry Kool



#### WEEK SIX ( Mar. 2nd - Mar 8th )

Back Row: Alan Evered, Fay Dunn, Darren Bellingham, Tim Gatehouse, Bill Hopkins, Keiichi Aotsuka, Nicole Evered, Udo Polzin, Danielle Shean.

Front row: Katerina Rajchl, Gerry Kool, Wendy White, Mary Walters, Richard Connelly, John Wilkins.

Absent: Anne Leorke, Mike Cleeland

Photographer: Lesley Kool

Images from the Eric the Red West fieldtrip in December 2007 – courtesy of Paul Chedgey

